

(No Model.)

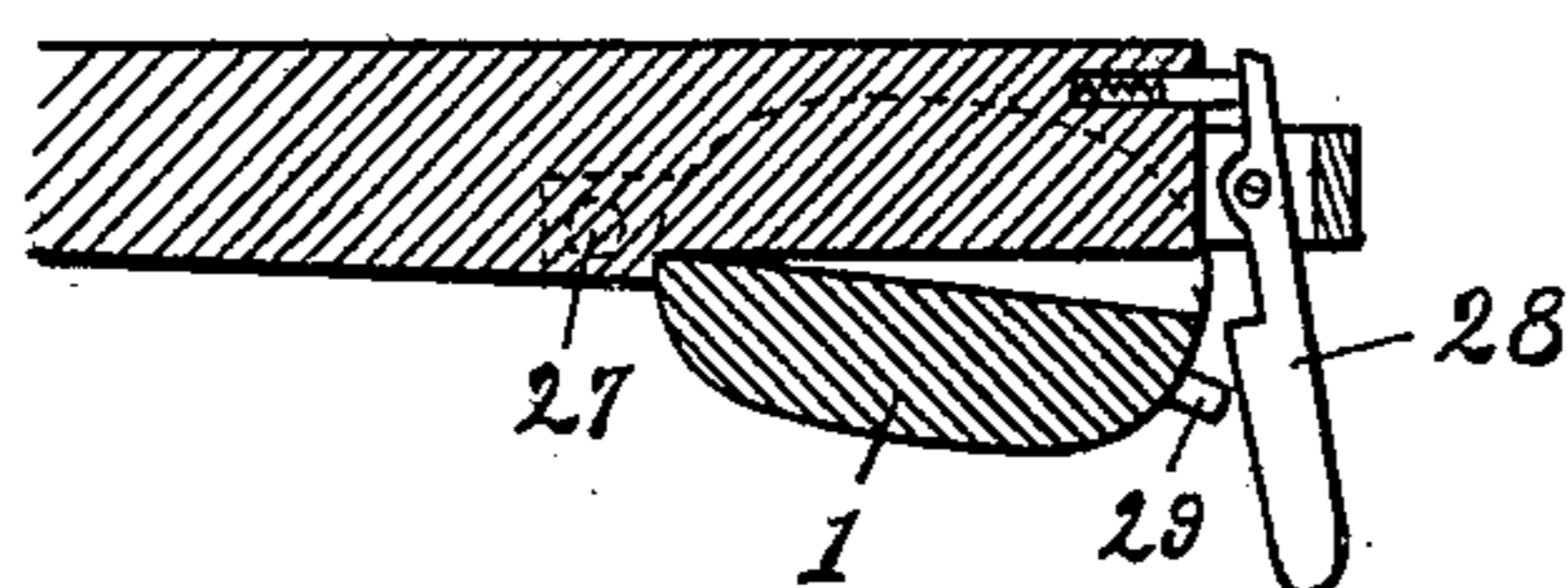
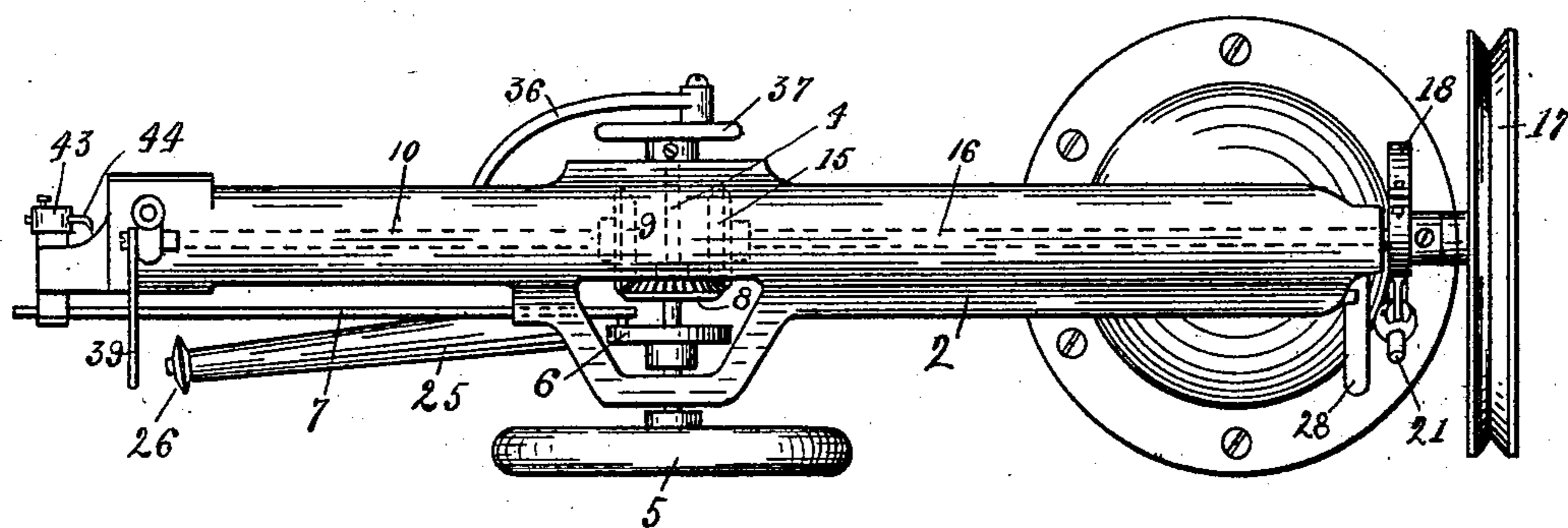
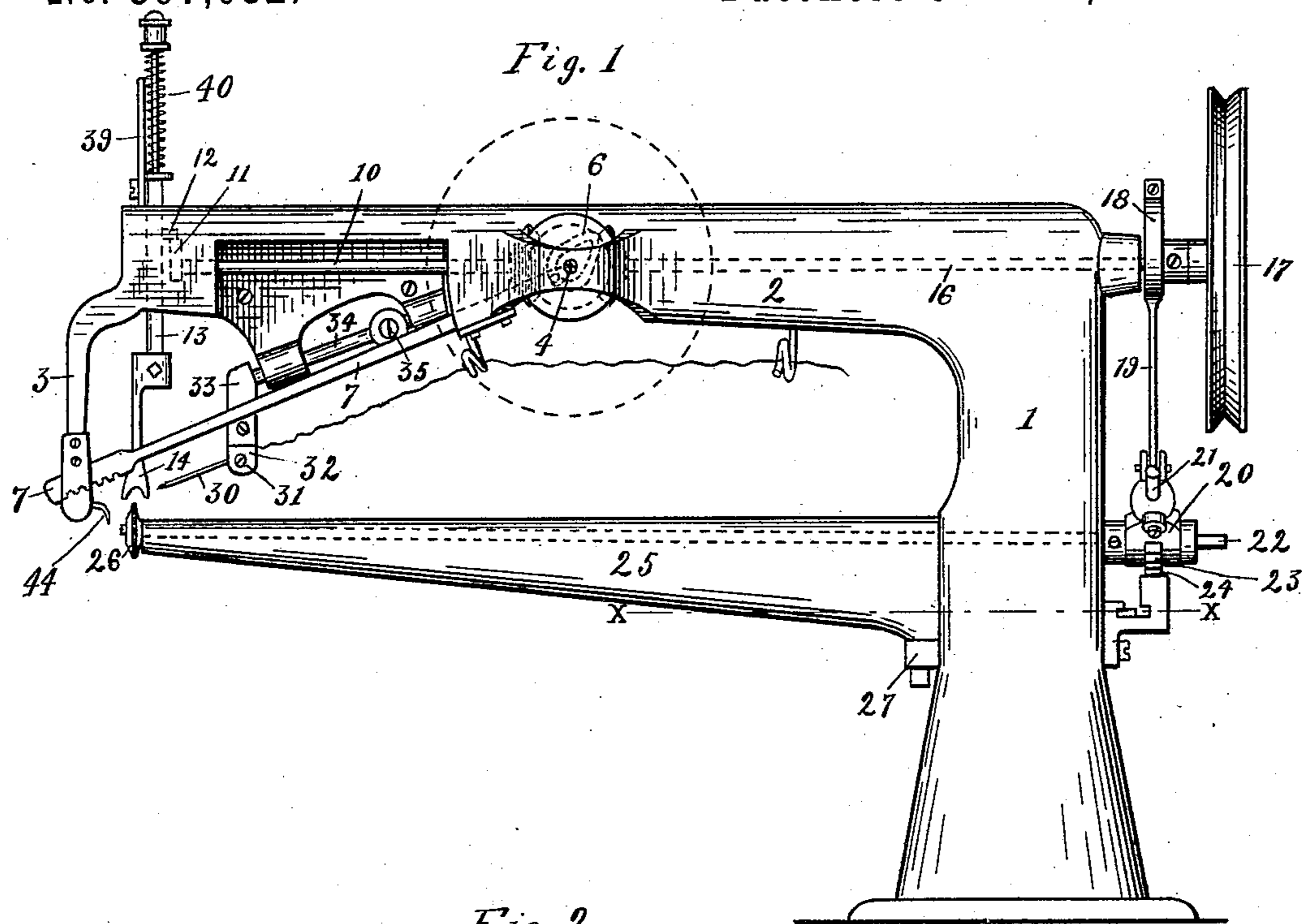
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H. H. HUMPHREY.

TUFTING MACHINE.

No. 397,082.

Patented Jan. 29, 1889.



Witnesses:

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John Whittemore

Inventor:

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Att'y.

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2 Sheets—Sheet 2.

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Fig. 3

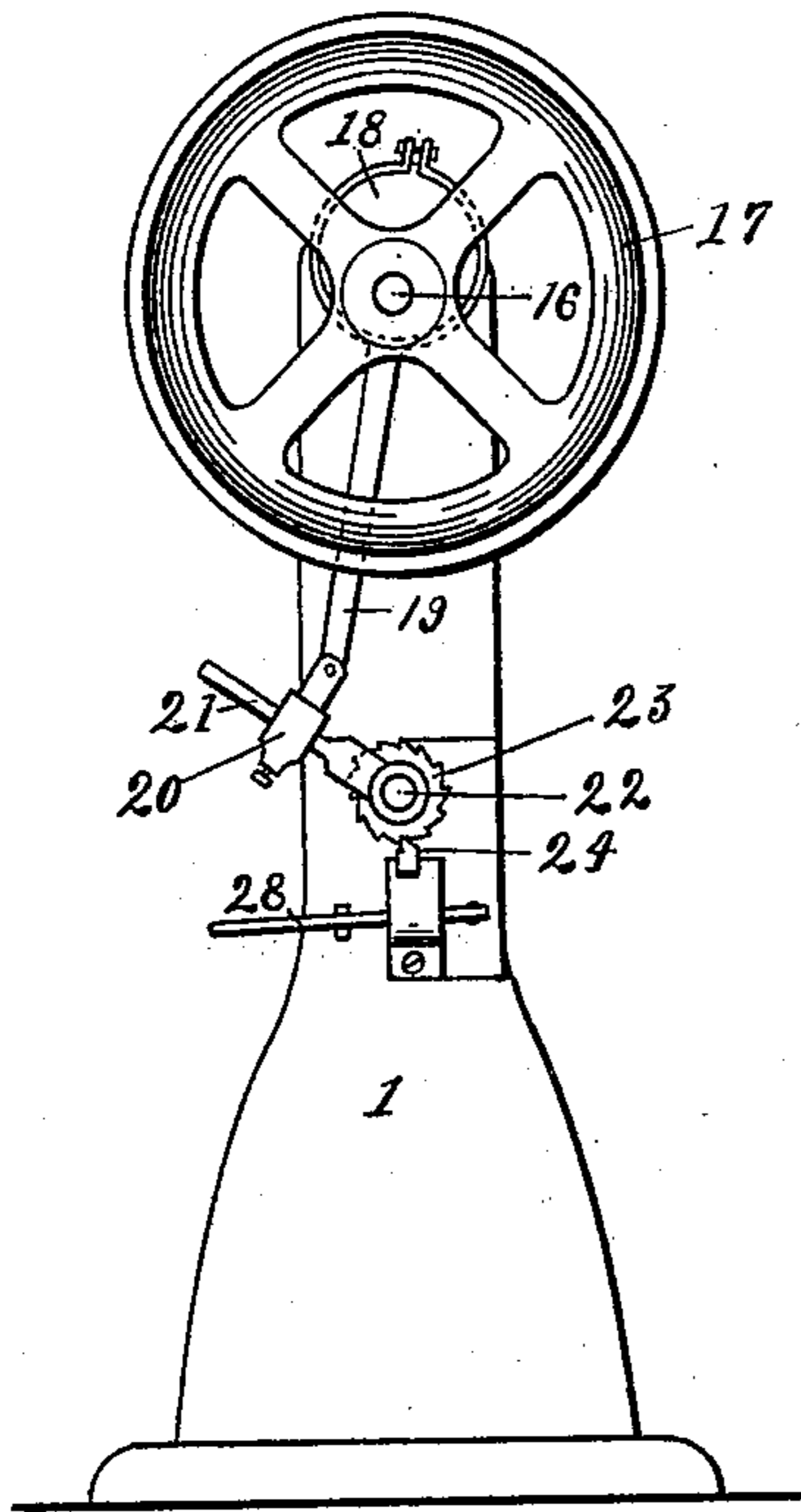


Fig. 4

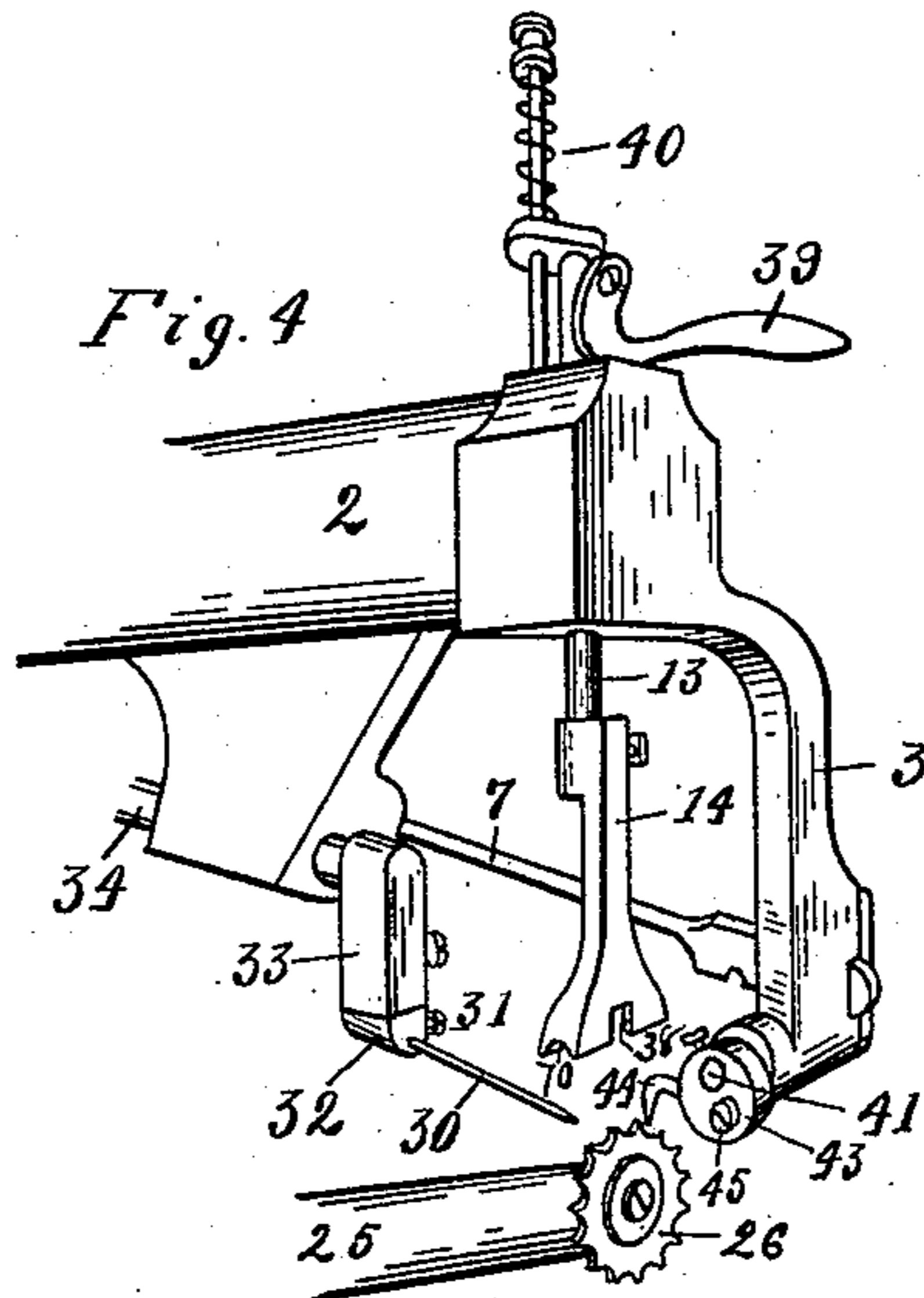


Fig. 6

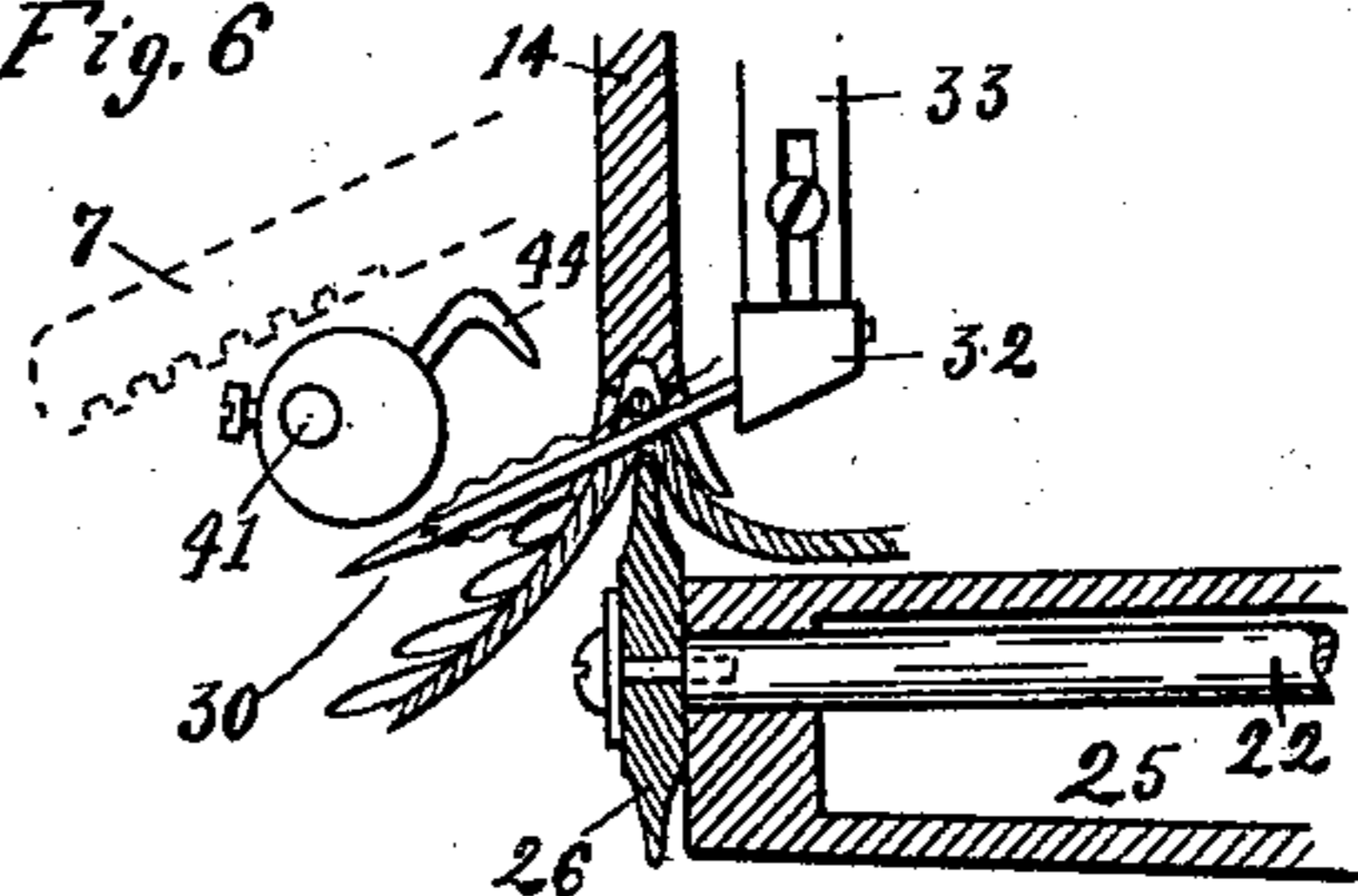
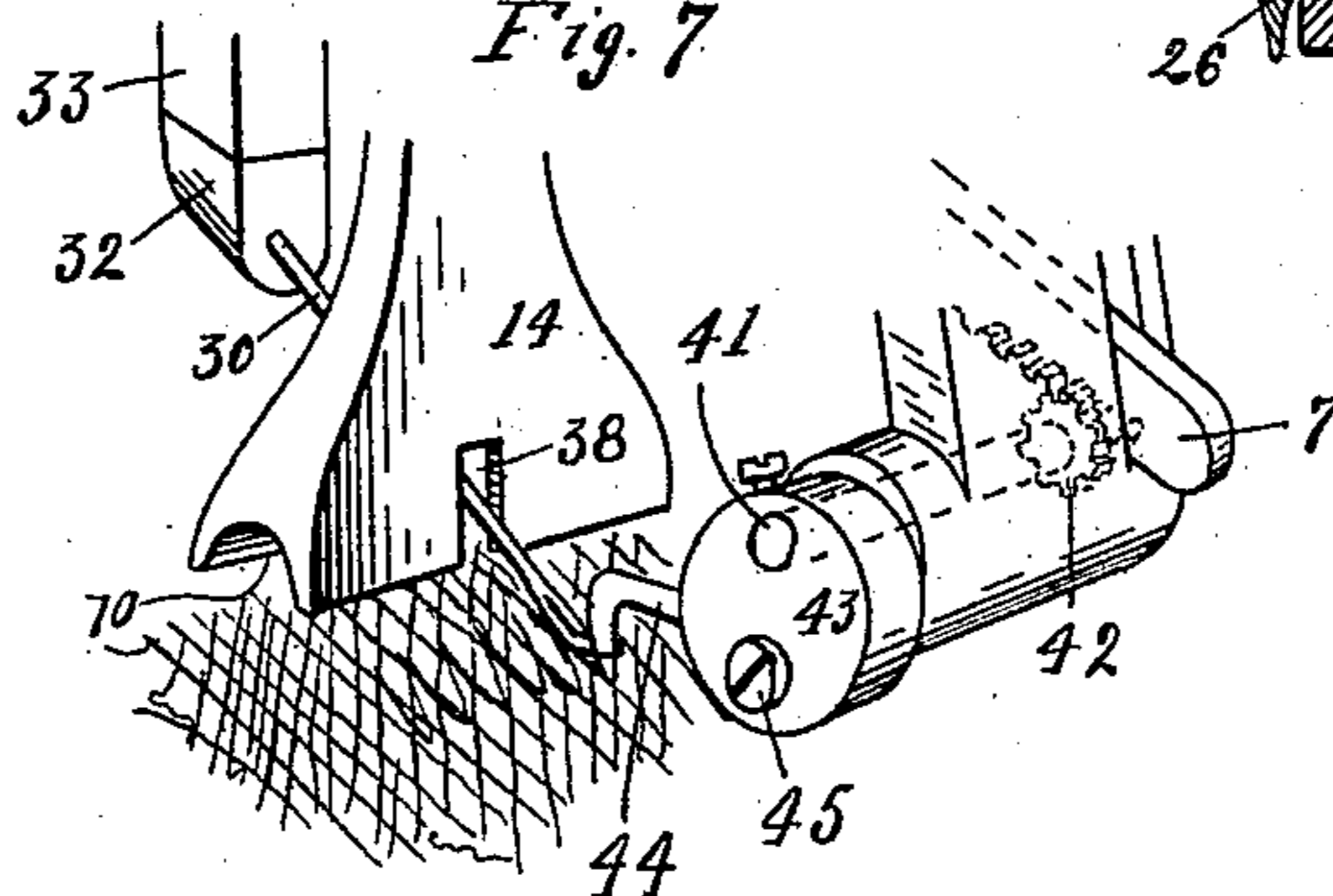


Fig. 7



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UNITED STATES PATENT OFFICE.

H. HUBERT HUMPHREY, OF DETROIT, MICHIGAN.

TUFTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 397,082, dated January 29, 1889.

Application filed February 2, 1888. Serial No. 262,721. (No model.)

To all whom it may concern:

Be it known that I, H. HUBERT HUMPHREY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Tufting-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in machines for making tufted lining, knit fabrics, and similar goods. In the manufacture of some kinds of knit goods—such as mittens, socks, &c.—it is customary to provide them with a lining of so-called tufting, made by closely covering the inner surface with loose yarn meshes; and it is the object of my invention to do this work by machinery in an economical and expeditious manner.

To this end my invention consists in the peculiar construction and organization of the different elements, all as more fully herein-after described, and specifically set forth in the claims.

In the drawings which accompany this specification, Figure 1 is a side elevation of my improved machine. Fig. 2 is a top plan. Fig. 3 is an end elevation. Fig. 4 is a perspective of the front end of the machine. Fig. 5 is a horizontal section on line *x x* in Fig. 1. Figs. 6 and 7 are details illustrating the operation of the machine in connection with the work.

The frame of the machine consists of the vertical post or standard 1, provided with a suitable foot for attaching it upon a work-table, and this standard is provided with the overhanging hollow arm 2, which projects at right angles therefrom and is provided at its forward end with the hanger 3. This arm 2 supports in suitable bearings the transverse shaft 4, to the front end of which is secured the hand-wheel 5.

6 is a grooved cam, into which engages, by means of suitable wrist-pin, the reciprocating rack-bar 7, and the miter-pinion 8, secured upon the same shaft, meshes with another miter-pinion, 9, which operates at one end of the horizontal shaft 10, which revolves in

suitable bearings within the hollow arm, and which is provided at its free end with the crank 11, engaging with the lifter 12 of the vertical reciprocating pressure-foot bar 13, to which the pressure-foot 14 is adjustably secured. The miter-pinion 8 also meshes with another miter-pinion, 15, upon the end of the longitudinal shaft 16, which revolves in suitable bearings within the arm 2, and carries at its free end the grooved drive-pulley 17 and the eccentric 18. This latter is provided with the eccentric-rod 19, pivotally connected to the cross-head 20, which is adjustably secured upon the feed-lever 21. This feed-lever turns loosely upon the feed-shaft 22, and by means of a suitable feed-pulley engages with the feed-ratchet 23, which is fast upon the shaft 22 and has a suitable back-stop, 24.

25 is the work-supporting hollow arm or rest, supported by the post 1 some distance below the hollow arm 2, and through this work-supporting arm the feed-shaft 22 passes, and is supported therein in suitable bearings, and has secured to its free end the serrated feed-disk 26. The work-supporting arm 25 is pivotally secured at 27, and carries upon its rear end the spring locking-latch 28, as shown in Fig. 5, which operates, in connection with the stop 29 on the standard 1, to lock the work-supporting arm to the standard or permit of its being unlocked and turned on its pivot to carry the feed-wheel 26 out from under the pressure-foot to permit of placing the work on or off the support.

The needle 30 is adjustably secured by a set-screw, 31, to the holder 32, which is vertically adjustably secured to the downwardly-projecting arm 33 of the reciprocating needle-bar 34, and this needle-bar has adjustably secured to it at 35 the crank-rod 36, which connects it with the crank-disk 37, secured upon the transverse shaft 4.

The pressure-foot 14 is provided upon its acting face with an arched recess, 70, as shown, and provided with the vertical slot 38, through which the needle operates, and the pressure-foot bar is provided with the lifting-lever 39, by means of which the pressure-foot may be vertically withdrawn from operation against the tension of the spring 40. The lower end

of the hanger 3 forms a bearing for a horizontal shaft, 41, to one end of which is secured a pinion, 42, which engages with the rack-bar 7, before described, and thereby imparts an oscillating motion to the eccentric 43, which is adjustably secured upon the shaft 41. This eccentric 41 carries the oscillating retaining-hook 44, adjustably secured to it by means of the set-screw 45.

In practice the machine is driven by suitable power applied to the pulley 17. From there it is transmitted upon the shaft 16, through the intermeshing bevel-pinions 15 and 8, to the transverse shaft 4, which intermittently reciprocates the rack-bar 7 and reciprocates the needle-bar 34 by means of the connections described. From the shaft 4 the power is transmitted to the shaft 10 by means of the intermeshing bevel-pinions 8 and 9, and this shaft intermittently raises the pressure-foot from the feed-wheel by means of the connections described, the spring 40 by its tension keeping the pressure-foot in the interval between its reciprocations down upon the work on the feed-wheel. The eccentric 18, which revolves with the shaft 16, actuates by means of the connections described the feed-shaft 22, and moves the feed-wheel the distance of one tooth, more or less, at each revolution of the drive-pulley, according to the adjustments made in these connections. The intermittent reciprocations of the rack-bar 7 impart to the retaining-hook 44 an intermittent oscillatory motion; and it will be seen that on account of its eccentric connection with the rock-shaft 41 the hook, while it oscillates between the relative positions shown in Figs. 6 and 7, has an eccentric or tilting motion, for the purpose hereinafter described.

The hand-wheel 5 serves as a convenient and safe means to enable the operator to adjust and operate the parts without the use of power.

In putting the machine to work the articles upon which the machine is designed to operate—such as mittens, &c.—are turned inside out and slipped over the free end of the work-support 25, after the same has been swung toward the operator, to bring it away from the operating parts, which would interfere with the convenient adjustment of the work. After the work is thus engaged, the work-support is turned into its normal position, where it is locked to the standard by the locking-latch 28, and then the pressure-foot 14 is released to permit it to hold the work down to the feed-wheel, as shown in Fig. 6. Upon motion being given to the parts, the forward reciprocation of the needle carries the thread through the fabric, while at the same time the retaining-hook 44 oscillates downwardly close to the needles, and passing with its point between the needle and the loop, so that upon the needle returning the yarn is drawn through the needle and a loop formed, as shown in Fig. 7. While the needle returns to make a new stitch the feed-disks feed the

work to one side, while at the same time the pressure-foot is withdrawn to release the fabric sufficiently to permit free feed, and simultaneously the retaining-hook 44 clears itself by an upward movement from the loop it holds, and this clearing motion is greatly assisted by the tilt of the hook, which approaches it toward the pressure-foot. Thus the parts continue to operate and form a series of loops upon the fabric, which, by the hands of the operator, is properly adjusted to cover the fabric in a regular manner with such loops to form what is called "tufting."

As will be seen, all the parts are made adjustable to work upon different classes of materials, and the nature of such adjustments to be made in changing materials will be easily understood by the practical operator.

What I claim as my invention is—

1. In a tufting-machine, the combination, with the work-support and the serrated feed-wheel carried thereon, of an intermittently vertically-reciprocating presser-foot bar, a longitudinally-recessed and transversely-slotted presser-foot carried by the foot-bar, and which at intervals holds the work in contact with the feed-wheel, the needle and means to reciprocate the same through the slot in the presser-foot in a plane inclined to the plane in which the presser-bar reciprocates, and an oscillating loop-retaining hook operating in the path of the needle in advance of the presser-foot, all arranged to operate substantially as described.

2. In a tufting-machine, the combination, with the standard of the frame, provided with an overhanging arm supporting near its free end the needle, presser-foot, and loop-retaining hook in relative operative position, substantially as described, of a work-support pivotally secured to the standard of the frame and the feed-wheel at the free end of said support, substantially as described.

3. In a tufting-machine, the combination, with the standard of the frame, provided with the overhanging arm supporting near its free end the stitch-forming mechanism of the machine, substantially as described, of the work-supporting arm 25, pivotally secured to the standard, and the automatically-operating locking-latch 28, and the pin 29 on the standard, engaging said latch, substantially as described.

4. In a tufting-machine, the combination, with the reciprocating needle and the rock-shaft 41, of the slotted presser-foot, the feed-disk, and the intermittently-oscillating retaining-hook 44, eccentrically secured to its actuating rock-shaft 41, and adapted to operate in a vertical plane in the path of the needle, substantially as described.

5. In a tufting-machine, the combination, with the reciprocating needle and suitable feeding mechanism, of the retaining-hook 44, the oscillating shaft 41, the eccentric 43, adjustably secured to said shaft and carrying

the retaining-hook, the pinion 42, and the reciprocating rack-bar 7, the parts being constructed to operate substantially as described.

5 6. In a tufting-machine, the combination, with the drive-pulley 17, the hand-wheel 5, and the needle and loop forming hook, of the shafts 10 and 16, the transverse shaft 4, the intermeshing bevel-pinions 8, 9, and 15, secured upon said shafts, respectively, the
10 grooved cam-wheel 6, the reciprocating rack-bar 7 and its actuating-connection with the retaining-hook 44, the crank-disk 37 and its actuating-connection with the reciprocating needle-bar, the crank 11 on the shaft 10 and
15 its actuating-connection with the reciprocating presser-foot bar, and the eccentric 18 and its actuating feed-connection with the feed-wheel 26, substantially as described.

7. In a tufting-machine, the combination, with the transverse shaft 4 and its actuating- 20 connection with the reciprocating needle-bar and needle, and oscillating retaining-hook, of suitable feed mechanism, the bevel gear-wheel 8, secured upon said shaft, the bevel gear-wheel 9, the shaft 10 and its actuating- 25 connection with the presser-foot bar, the bevel gear-wheel 15, the drive-pulley 17, and the main drive-shaft 16 and its actuating-connection, substantially as described.

In testimony whereof I affix my signature, in 30 presence of two witnesses, this 7th day of January, 1888.

H. HUBERT HUMPHREY.

Witnesses:

C. H. SMITH,
ADOLPH BARTHEL.